Key
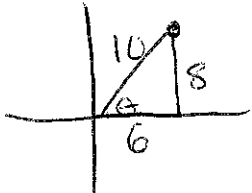
Trigonometric Functions of General Angles

Sketch a triangle in standard position whose terminal side intersects the following coordinate point. Then find all six trigonometric functions.

1. (6, 8)

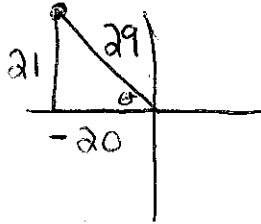$$\sin\theta = \frac{4}{5} \qquad \csc\theta = \frac{5}{4}$$
$$\cos\theta = \frac{3}{5} \qquad \sec\theta = \frac{5}{3}$$
$$\tan\theta = \frac{4}{3} \qquad \cot\theta = \frac{3}{4}$$

2. (-20, 21)

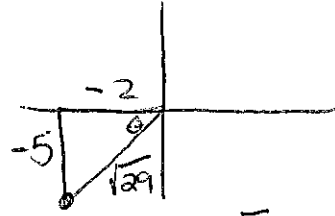$$\sin\theta = \frac{21}{29} \qquad \csc\theta = \frac{29}{21}$$
$$\cos\theta = \frac{-20}{29} \qquad \sec\theta = \frac{-29}{20}$$
$$\tan\theta = \frac{-21}{20} \qquad \cot\theta = \frac{-20}{21}$$

3. (-2, -5)

$$\sin\theta = \frac{-5\sqrt{29}}{29} \qquad \csc\theta = \frac{-\sqrt{29}}{5}$$
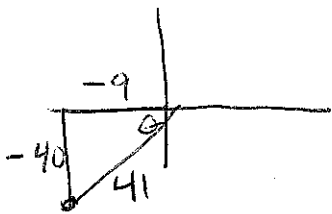$$\cos\theta = \frac{-2\sqrt{29}}{29} \qquad \sec\theta = -\frac{\sqrt{29}}{2}$$
$$\tan\theta = \frac{5}{2} \qquad \cot\theta = \frac{2}{5}$$

4. (-9, -40)

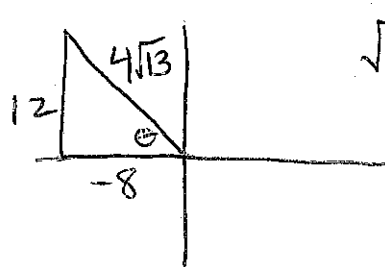$$\sin\theta = \frac{-40}{41} \qquad \csc\theta = \frac{-41}{40}$$
$$\cos\theta = -\frac{9}{41} \qquad \sec\theta = \frac{-41}{9}$$
$$\tan\theta = \frac{40}{9} \qquad \cot\theta = \frac{9}{40}$$

5. (-8, 12)

$$\sqrt{208} = 4\sqrt{13}$$

$$\sin\theta = \frac{12}{4\sqrt{13}} = \frac{3}{\sqrt{13}} = \frac{3\sqrt{13}}{13} \qquad \csc\theta = \frac{\sqrt{13}}{3}$$
$$\cos\theta = \frac{-8}{4\sqrt{13}} = \frac{-2}{\sqrt{13}} = \frac{-2\sqrt{13}}{13} \qquad \sec\theta = -\frac{\sqrt{13}}{2}$$
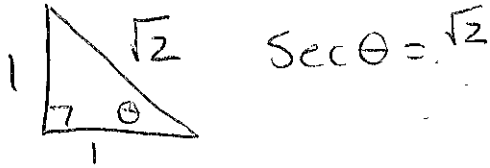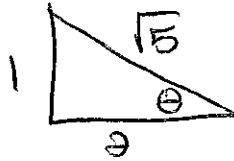$$\tan\theta = -\frac{3}{2} \qquad \cot\theta = -\frac{2}{3}$$

Key

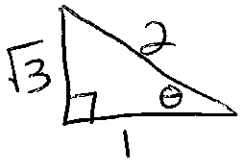**Find the exact value of each expression if $0° < \theta < 90°$.** (Quadrant 1)

1. If $\tan \theta = 1$, find $\sec \theta$.

$\sec \theta = \sqrt{2}$

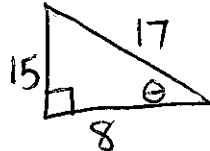**2.** If $\tan \theta = \frac{1}{2}$, find $\cos \theta$. $= \dfrac{2\sqrt{5}}{5}$

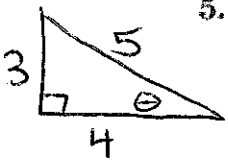**3.** If $\sec \theta = 2$, find $\cos \theta$. $= \dfrac{1}{2}$

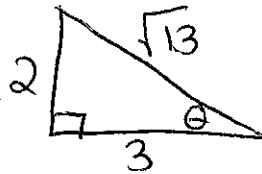**4.** If $\cos \theta = \frac{8}{17}$, find $\csc \theta$. $= \dfrac{17}{15}$

Find the exact value of each expression if $90° < \theta < 180°$. (Quadrant 11)

5. If $\cos \theta = -\frac{4}{5}$, find $\sin \theta$. $= \dfrac{3}{5}$

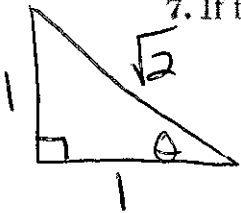$\sin \theta$ is positive

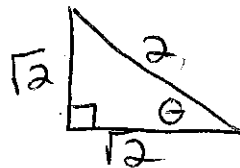**6.** If $\cot \theta = -\frac{3}{2}$, find $\cos \theta$. $= \dfrac{-3\sqrt{13}}{13}$

$\cos \theta$ is negative

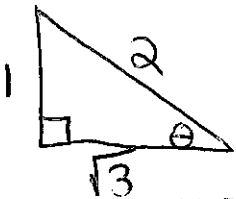**Find the exact value of each expression if $180° < \theta < 270°$.** (Quadrant 111)

7. If $\tan \theta = 1$, find $\cos \theta$. $= \dfrac{-\sqrt{2}}{2}$
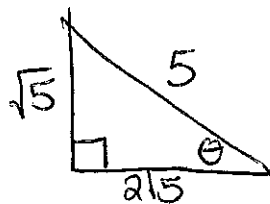
8. If $\sin \theta = -\frac{\sqrt{2}}{2}$, find $\tan \theta$. $= 1$

9. If $\csc \theta = -2$, find $\cos \theta$. $-\dfrac{\sqrt{3}}{2}$

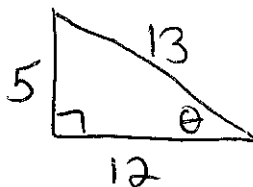**10.** If $\cos \theta = -\frac{2\sqrt{5}}{5}$, find $\tan \theta$.

$\tan \theta = \dfrac{\sqrt{5}}{2\sqrt{5}} = \dfrac{1}{2}$

11. If $\csc \theta = -2$, find $\cot \theta$.

$\cot \theta = \sqrt{3}$

12. If $\sin \theta = -\frac{5}{13}$, find $\tan \theta$.

$\tan \theta = \dfrac{5}{12}$

tangent is positive in Q3.